

What is claimed is:

1. A cell driving type actuator wherein a plurality of piezoelectric/electrostrictive elements are arranged in alignment like teeth of a comb on a base plate and said actuator is a piezoelectric/electrostrictive actuator being driven by means of dislocation of piezoelectric/electrostrictive elements,

characterized in that each of cells is formed independently from its adjacent cells by closing respective planes being positioned between two adjacent piezoelectric/electrostrictive elements and facing the base plate with respective cover plates.

2. A cell driving type actuator according to claim 1, wherein the polarization field of said piezoelectric/electrostrictive elements and the driving electric field are aligned in the same direction.

3. A cell driving type actuator according to claim 1, wherein the degree of profile for the surface of said cell is approximately 8  $\mu\text{m}$  or less.

4. A cell driving type actuator according to claim 1, wherein the ratio of the minimum spacing between the

adjacent piezoelectric/electrostrictive elements forming said cell to the minimum spacing between said base plate and said cover plate is approximately 1:2 to 1:40.

- 5 5. A cell driving type actuator according to claim 1,  
wherein the ratio of the spacing between said cell and the  
adjacent cell to the minimum spacing between said base plate  
and said cover plate is approximately 1:2 to 1:40.
- 10 6. A cell driving type actuator according to claim 1,  
wherein the minimum spacing between the adjacent  
piezoelectric/electrostrictive elements forming said cell is  
approximately 60  $\mu\text{m}$  or less.
- 15 7. A cell driving type actuator according to claim 1,  
wherein the spacing between said cell and the adjacent cell  
is approximately 50  $\mu\text{m}$  or less.
8. A cell driving type actuator according to claim 1,  
20 wherein the surface roughness  $R_t$  of the wall surfaces of the  
piezoelectric/electrostrictive elements is approximately 10  
 $\mu\text{m}$  or less, said elements facing one another and forming  
said cell.
- 25 9. A cell driving type actuator according to claim 1,

wherein the width of the comb-like piezoelectric/  
electrostrictive elements varies from a recess to the front  
end of the comb tooth.

5 10. A cell driving type actuator according to claim 1,  
wherein the spacing between the adjacent piezoelectric/  
electrostrictive elements forming said cell, or the spacing  
between said cell and the adjacent cell has at least two  
different values.

10

11. A liquid discharging device equipped with the cell  
driving type actuator according to claim 1, wherein, each  
cell is used as a liquid pressurizing chamber, and said  
piezoelectric/electrostrictive elements are displaced by  
15 applying a driving electric field thereto in the same  
direction as the polarization field of said  
piezoelectric/electrostrictive elements, thus deforming said  
liquid chamber, thereby enabling a liquid filled in said  
liquid chamber to be discharged in the direction of the  
20 front end of the comb teeth.

20

12. A method for manufacturing, by utilizing a punch and a  
die, a cell driving type actuator wherein a plurality of  
piezoelectric/electrostrictive elements are arranged in  
25 alignment like teeth of a comb on a base plate; each cell

25

being formed by closing two adjacent piezoelectric/  
electrostrictive elements disposed on the base plate with a  
cover plate positioned at a plane facing the base plate in  
such a manner that said cell is formed independently from  
5 its adjacent cells,

characterized in that said method comprises the steps  
of:

providing a plurality of green sheets made of  
piezoelectric/electrostrictive material,

10 machining slit apertures in all of said green sheets  
with said punch, laminating all the green sheets after  
positioning them, thus forming comb-like piezoelectric/  
electrostrictive elements.

15 13. A method for manufacturing, by utilizing a punch and a  
die, a cell driving type actuator wherein a plurality of  
piezoelectric/electrostrictive elements are arranged in  
alignment like teeth of a comb on a base plate; each cell  
being formed by closing two adjacent piezoelectric/  
20 electrostrictive elements disposed on the base plate with a  
cover plate positioned at a plane facing the base plate in  
such a manner that said cell is formed independently from  
its adjacent cells,

characterized in that said method comprises:

25 a step of providing a plurality of green sheets made of

piezoelectric/electrostrictive material,

a first step of machining first slit apertures in a first green sheet with the punch,

a second step of moving the first green sheet upwards  
5 into tight contact with a stripper in the state of not withdrawing the punch from the first slit apertures,

a third step of moving the punch upwards in such a way that the front end of the punch is withdrawn slightly from the lowest part of the first green sheet which moves upwards,

10 a fourth step of machining second slit apertures in a second green sheet with the punch,

a fifth step of moving the second green sheet upwards, together with the first green sheet in the state of not withdrawing the punch from the second slit apertures,

15 and a sixth step of moving the punch upwards in such a way that the front end of the punch is withdrawn slightly from the lowest part of the second green sheet which moves upwards, and thereafter,

laminating a plurality of green sheets by repeating the  
20 fourth to sixth steps so as to form a plurality of comb-like piezoelectric/electrostrictive layers.